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I-20122 Milano (IT)(54) **Femoral prosthesis for recovering a prosthesis implantation which has provided negative results.**

(57) The invention relates to a femoral prosthesis which has been specifically designed for recovering prosthesis implantations which have provided negative results, the femoral prosthesis comprising a proximal body, which is removably coupled to a distal body or stem. The proximal body is provided, at a proximal end portion thereof, with a substantially elliptical cross-section, which is gradually changed to a circular configuration toward the distal tip portion, where a conic seat is provided for connection with the conic end-piece of the stem. The stem, in particular, has a star cross-section configuration.

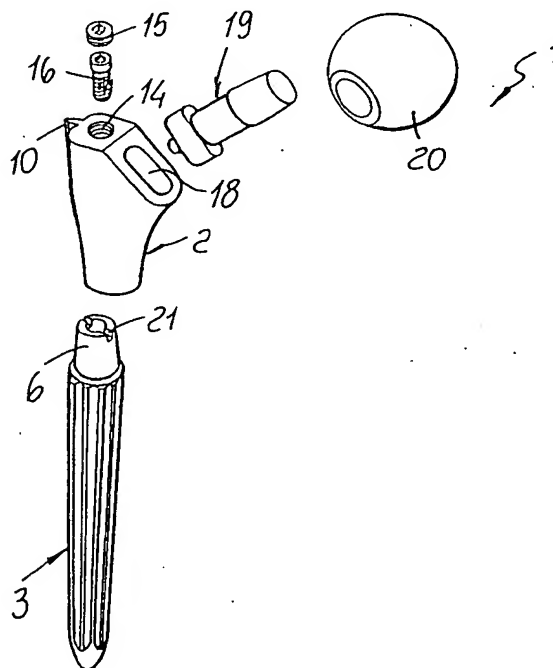


FIG. 2

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## BACKGROUND OF THE INVENTION

The present invention relates to a femoral prosthesis, which has been particularly designed for recovering prosthesis implantations which have provided negative results.

As is known, prior femoral prostheses are conventionally made in a single body.

This construction does not allow an operation staff to properly fit the prosthesis to a patient, mainly in those cases in which it is necessary to modify or recover prosthesis implantations which have provided a negative result for not having had success.

## SUMMARY OF THE INVENTION

Accordingly, the aim of the present invention is to solve the above mentioned problem, by providing a femoral prosthesis, made of modular elements, which can be perfectly fitted to the different femoral patterns of the patients, mainly in those cases in which it is necessary to replace existing prostheses, which have provided a negative result.

Within the scope of the above mentioned aim, a main object of the present invention is to provide such a femoral prosthesis, which can be perfectly anchored to the femoral bone, and is not susceptible to undesired rotary movements and is moreover adapted to improve the primary anchoring thereof to the femoral bone.

Another object of the present invention is to provide such a femoral prosthesis which is very reliable and safe in operation.

Yet another object of the present invention is to provide such a femoral prosthesis which can be quickly and firmly coupled to the implements which are used for introducing the prosthesis into the femoral bone and removing it from said bone.

According to one aspect of the present invention, the above mentioned aim and objects, as well as yet other objects, which will become more apparent hereinafter, are achieved by a femoral prosthesis, which has been specifically designed for recovering prosthesis implantations which have provided negative results, characterized in that said femoral prosthesis comprises a proximal body, removably coupled to a distal body or stem, said proximal body having, at a proximal end portion thereof, a substantially elliptical cross-section which is changed to a substantially circular configuration toward the distal tip portion, where a coupling conic seat is provided for coupling with the conic end-piece of the stem, said stem having a substantially star-like cross-section configuration.

## BRIEF DESCRIPTION OF THE DRAWINGS

Further characteristics and advantages of the present invention will become more apparent hereinafter from the following detailed disclosure of a preferred, though not exclusive, embodiment of a femoral prosthesis, which has been specifically designed for recovering prosthesis implantations which have provided negative results, and which is illustrated, by way of an indicative, but not limitative example, in the accompanying drawings, where:

Figure 1 is a front elevation view illustrating the subject femoral prosthesis in an assembled condition thereof;

Figure 2 is an exploded perspective view illustrating the femoral prosthesis according to the invention;

Figure 3 is a front elevation view illustrating the proximal body of the prosthesis;

Figure 4 is a further side elevation view illustrating the proximal body of the prosthesis;

Figure 5 is a top plan view illustrating the proximal body of the prosthesis;

Figure 6 is a cross-sectional view, substantially taken along the section line VI-VI of Figure 5;

Figure 7 is a further cross-sectional view, substantially taken along the section line VII-VII of Figure 6;

Figures 8, 9 and 10 illustrate the distal body or stem of the prosthesis made with three different lengths;

Figure 11 is a cross-sectional view substantially taken along the line XI-XI of Figure 10;

Figure 12 is a cross-sectional exploded view of the femoral prosthesis;

Figure 13 illustrates the subject prosthesis in an assembled condition, the proximal body being shown in cross-section; and

Figure 14 is a further cross-sectional view substantially taken along the line XII-XII of Figure 8.

## DESCRIPTION OF THE PREFERRED EMBODIMENTS

With reference to the number references of the above mentioned figures, the subject femoral prosthesis, which has been specifically designed for recovering prosthesis implantations or systems which have provided negative results, which has been generally indicated by the reference number 1, comprises a proximal body 2 and a stem 3, which can be removably coupled to the proximal body.

The proximal body 2 is provided, at the proximal end portion thereof, with a substantially elliptical cross-section configuration, which is changed or reduced toward the distal tip portion, indicated at

4, where it has a substantial circular configuration.

At the tip portion 4, there is provided a conic seat or recess 5, in which the conic end-piece 6 of the distal body or stem 3 can be engaged.

The body 2 is provided, at the proximal portion thereof, and in its side region, with a substantially triangular cross-section wing 10, the function of which is that of preventing the prosthesis from rotating and improving the primary anchoring thereof.

Moreover, at the wing 10, there is provided a throughgoing hole 11, allowing to affix the muscle fascia.

Inside the body 2, and aligned with the conic seat 5, is provided a throughgoing channel 12 which, toward the distal end portion thereof, is delimited by an abutment 13, whereas on the top a threaded seat 14 is provided.

In the threaded seat 14 a plug 15 can be engaged, said plug preventing possible physiologic liquids from entering; the connection with the stem 3 being performed by a screw 16, engaging in the channel 12 and having the head thereof abutting against the abutment 13.

At the medial proximal region there is provided an oval seat 18, in which can be engaged the neck 19 to which a head 20 can be connected.

The proximal body 2 is provided in several sizes.

The distal body or stem, in turn, is made with different lengths, as is clearly shown in Figures 8 to 10.

Each length, moreover, is available with different sizes.

A main feature of the invention is that the stem is provided, in its cross-section, with a substantially star-like configuration.

On the proximal tip portion there is provided the conic end-piece 6, which is provided with a threaded hole 6a in which the screw 16 is engaged.

On the top surface on the conic end-piece, there is moreover provided a cross slot 21 which allows, by using a suitable implement, to properly locate the stem inside the femoral canal.

The stems are made by providing a conic distal portion, indicated at 3a and possibly a proximal portion 3b, which, the size being the same, is the same for all of the lengths.

If necessary, is moreover provided a cylindrical portion 3c having different lengths.

Moreover, the larger length stems are so bent as to allow them to be perfectly fitted to the curvature of the femoral diaphysis, as is schematically shown in Figure 8.

In order to facilitate the introduction of the larger length stems inside the femoral canal, it is provided that along the longitudinal extension of the stems, the substantially star-like cross section

is lacking of the star points arranged on the convex and concave portions of the stems, as clearly shown in Figure 14.

Owing to the disclosed construction, a femoral prosthesis has been provided which can be made by modular elements which can be easily assembled so as to allow the operating staff to choose the optimal femoral prosthesis size, depending on the pattern of the patient femoral bone.

Moreover, the provision of easily and quickly assembleable modular elements allow to greatly facilitate the implantation of the prosthesis.

The invention as disclosed is susceptible to several modifications and variations, all of which will come within the scope of the inventive idea.

Moreover, all the details can be replaced by other technically equivalent elements.

In practicing the invention, the used materials, as well as the contingent size and shapes, can be any, depending on requirements.

#### Claims

1. A femoral prosthesis (1), which has been specifically designed for recovering prosthesis implantations which have provided negative results, characterized in that said femoral prosthesis comprises a proximal body (2), removably coupled to a distal body or stem (3), said proximal body (2) having, at a proximal end portion thereof, a substantially elliptical cross-section which is changed to a substantially circular configuration toward the distal tip portion (4), where a coupling conic seat (5) is provided for coupling with the conic end-piece (6) of the stem, said stem having a substantially star-like cross-section configuration.
2. A femoral prosthesis, according to the preceding claim, characterized in that said proximal body is provided, at the proximal-side region thereof, with a wing (10) having a substantially triangular cross-section, and extending for a longitudinal portion.
3. A femoral prosthesis, according to Claims 1 and 2, characterized in that said wing (10) is provided with a throughgoing hole (11).
4. A femoral prosthesis, according to one or more of the preceding claims, characterized in that said prosthesis further comprises, through the proximal body (2), on the extension of said conic seat (5), a throughgoing channel (12) for engaging therein a screw (16) for the connection with the end-piece (6) of the stem (3).

5. A femoral prosthesis, according to one or more of the preceding claims, characterized in that said channel (12), at the proximal end portion thereof, is provided with a threaded seat (14) for engaging therein a plug (15). 5
6. A femoral prosthesis, according to one or more of the preceding claims, characterized in that said proximal body (2) is provided, in the medial-proximal region thereof, with an oval seat (18) for the connection with a neck (19) in turn connected with a head (20). 10
7. A femoral prosthesis, according to one or more of the preceding claims, characterized in that said distal body or stem (3) is provided with a distal portion (3a) tapering toward the distal tip portion. 15
8. A femoral prosthesis, according to one or more of the preceding claims, characterized in that said stem (3) is provided with a proximal portion (3b) which is the same, the size being the same, for all of the lengths of the stem and that, depending on said lengths, there are provided cylindrical central portions (3c) having different lengths. 20 25
9. A femoral prosthesis, according to one or more of the preceding claims, characterized in that the larger length stems (3) are so bent as to be precisely fitted to the curvature of the femoral diaphysis. 30
10. A femoral prosthesis, according to one or more of the preceding claims, characterized in that along the overall extension of said larger length stems (3), said substantially star-like cross-section is lacking of one or more points arranged on the convex and concave portions of said stems. 35 40
11. A femoral prosthesis, according to one or more of the preceding claims, characterized in that said conic end-piece (6) of said stem is provided with a threaded hole (6a) in which is engaged a screw (16) for connection with said proximal body (2). 45

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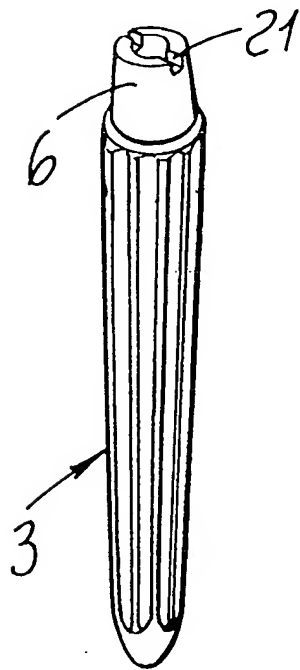
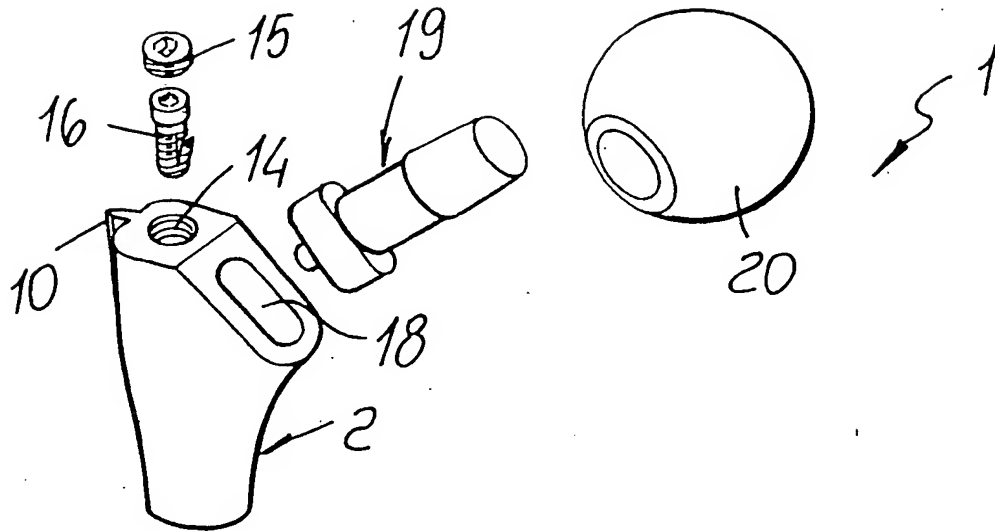


FIG. 2

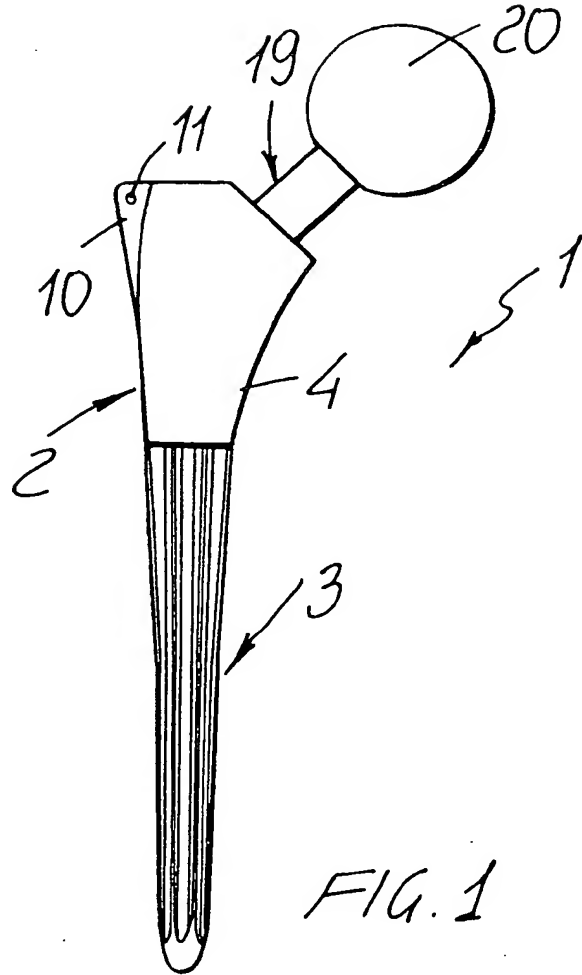


FIG. 1

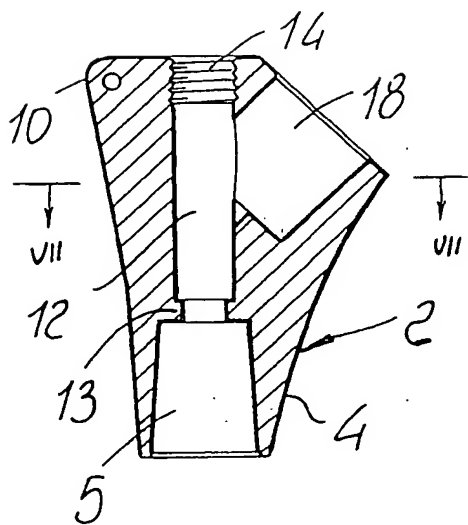


FIG. 6

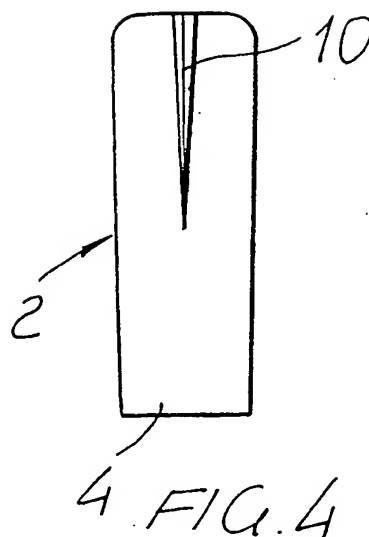


FIG. 4

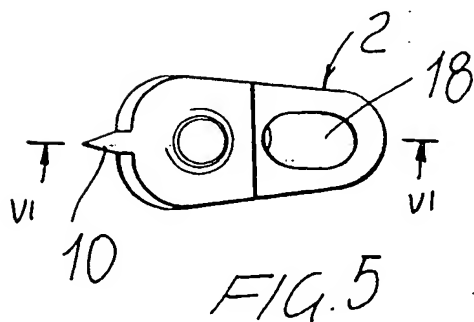


FIG. 5

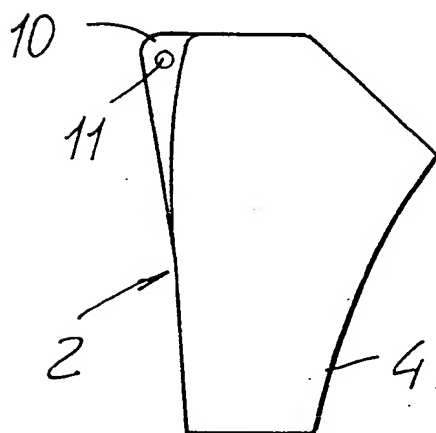


FIG. 3

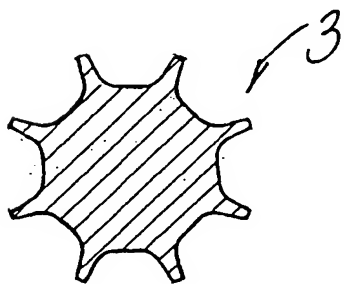


FIG. 11

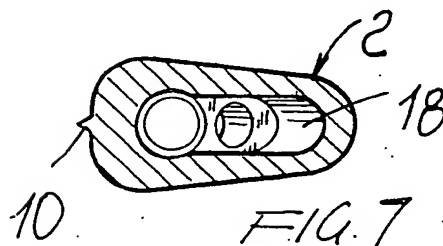


FIG. 7

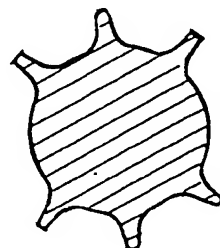


FIG. 14

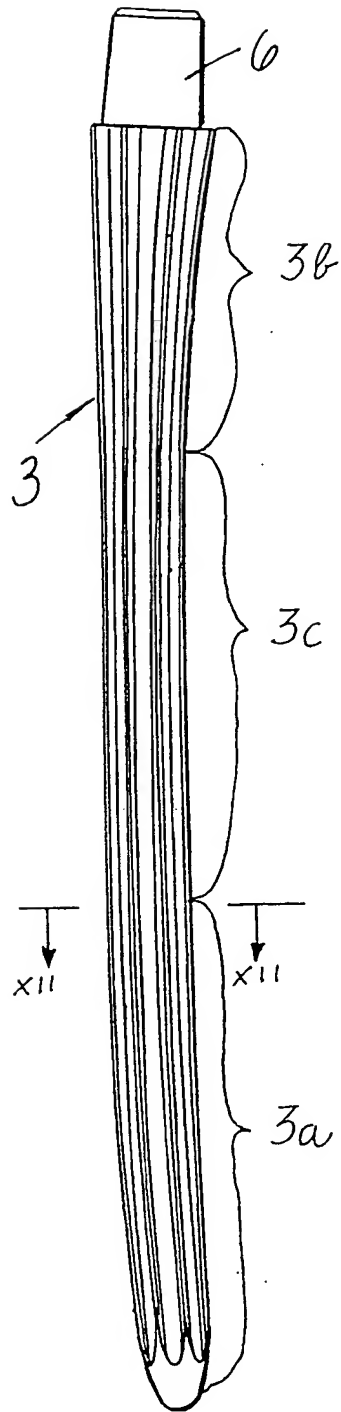


FIG. 8

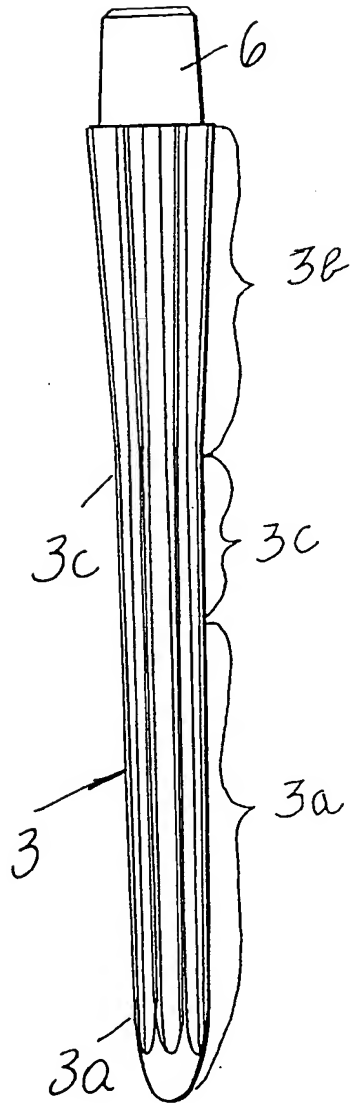


FIG. 9

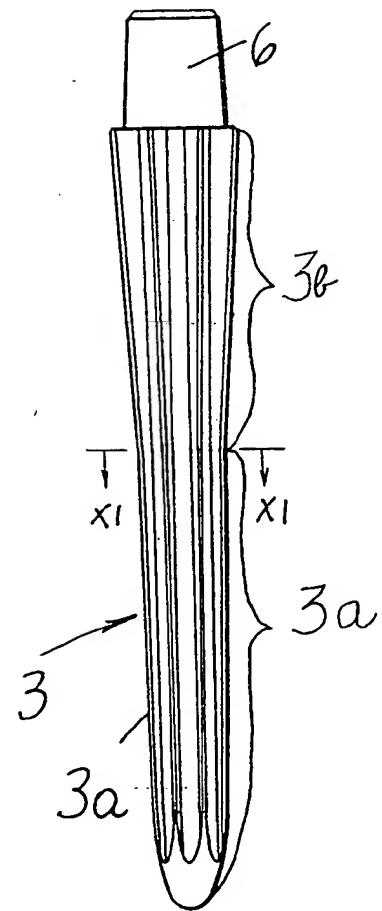
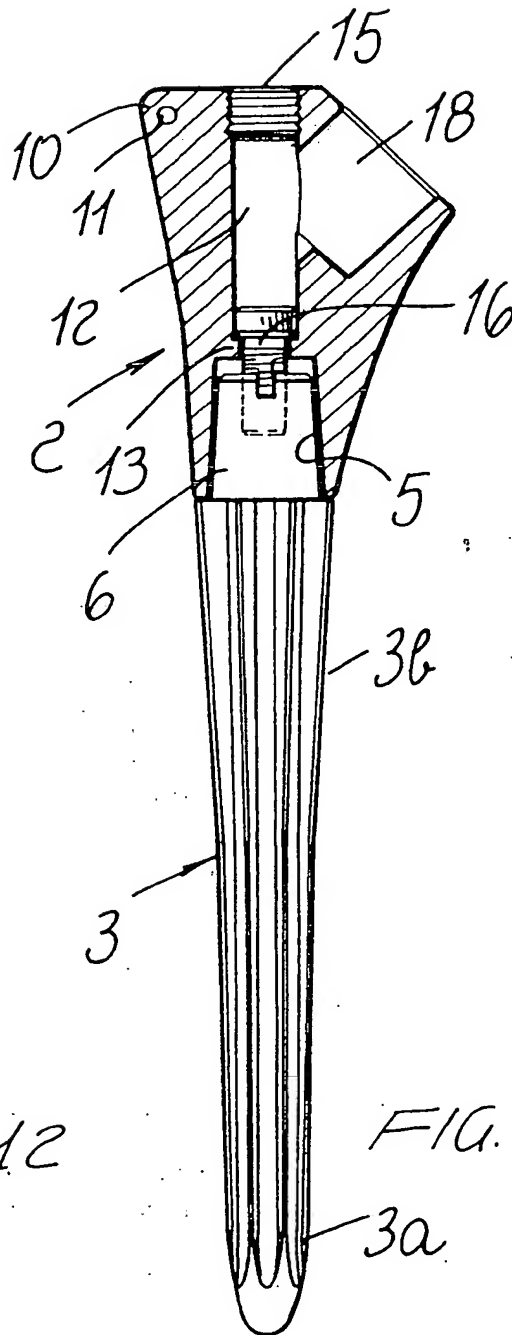
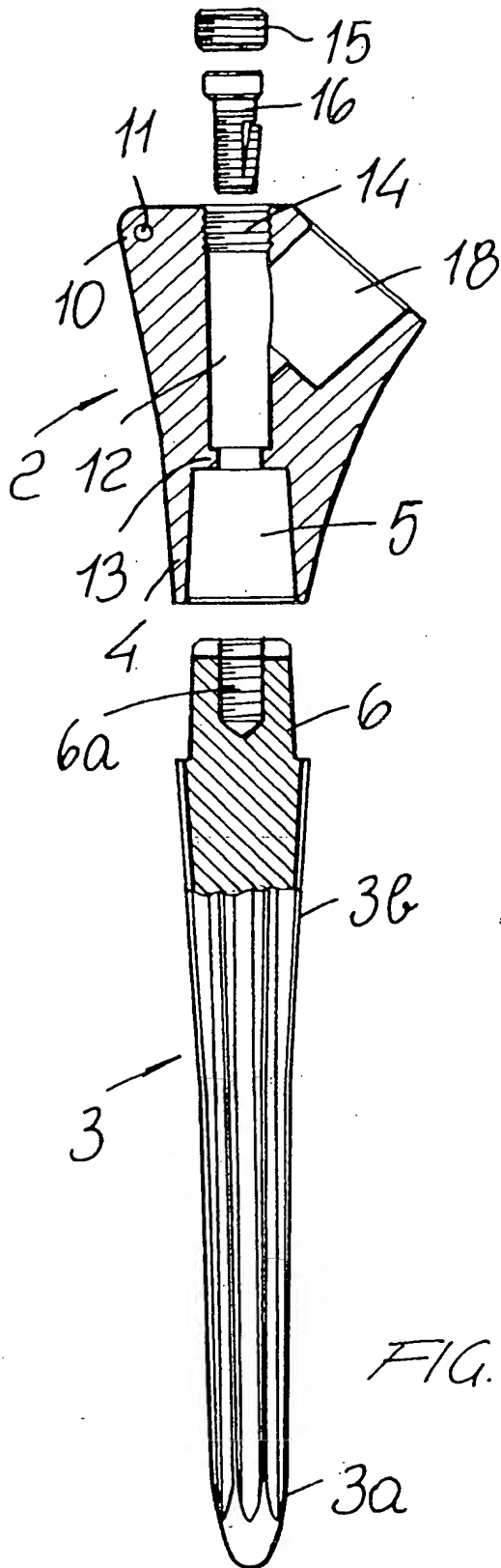
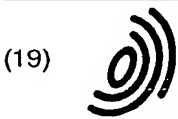


FIG. 10







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(54) Femoral prosthesis for recovering a prosthesis implantation which has provided negative results

(57) The invention relates to a femoral prosthesis (1) which has been specifically designed for recovering prosthesis implantations which have provided negative results, the femoral prosthesis (1) comprising a proximal body (2), which is removably coupled to a distal body or stem (3). The proximal body (2) is provided, at a proximal end portion thereof, with a substantially elliptical cross-section, which is gradually changed to a circular configuration toward the distal tip portion (4), where a conical seat (5) is provided for connection with the conical end-piece (6) of the stem (3). The stem (3), in particular, has a star cross-section configuration.

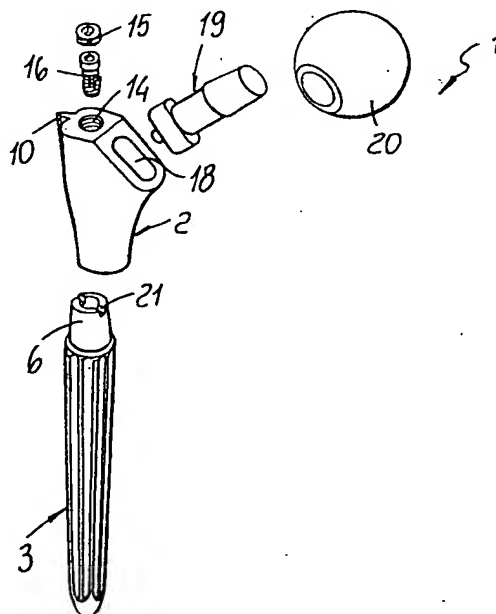


FIG. 2

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## EUROPEAN SEARCH REPORT

Application Number  
EP 95 83 0097

DOCUMENTS CONSIDERED TO BE RELEVANT			
Category	Citation of document with indication, where appropriate, of relevant passages	Relevant to claim	CLASSIFICATION OF THE APPLICATION (Int.Cl.6)
X Y	EP-A-0 567 349 (SMITH & NEPHEW RICHARDS) * column 8, line 7 - column 15, line 3; figures 1,3-5,7-11,14 * * figures 18,26,30,31 * ---	1,4,8,9 2,3,5-7, 10,11	A61F2/36
Y A	DE-A-38 29 361 (ORTHOPLANT ENDOPROTHETIK) * claim 18; figures 1,5,14 * ---	2,3,7 10	
Y A	EP-A-0 462 357 (HOWMEDICA) * claim 2; figures 4-7 * ---	5 4	
Y	EP-A-0 310 566 (CREMASCOLI) * column 2, line 62 - column 3, line 5; claims 4,5; figures 2-4 * ---	6	
Y	EP-A-0 159 462 (ORTHOPLANT ENDOPROTHETIK) * figures 4,5 * ---	10	
Y A	WO-A-91 18563 (E.I. DU PONT DE NEMOURS) * page 6, line 22 - page 7, line 20; figure 2 * ---	11 4	
			TECHNICAL FIELDS SEARCHED (Int.Cl.6)
X	FR-A-2 640 497 (MESGUICH) * page 3, line 12 - line 16 * * page 4, line 22 - line 27 * * page 4, line 35 - page 5, line 2; claims 2,6; figures 1,3 * ---	1,4,7,11	A61F
A	FR-A-2 629 707 (ROUX) * figure 4 * ---	8	
P,X	EP-A-0 634 154 (MEC HINT) * the whole document * ---	1,4,7,11	
P,X A	DE-A-43 20 086 (BREHM) * the whole document * -----	1,4,7,9, 11 2,3	
The present search report has been drawn up for all claims			
Place of search THE HAGUE		Date of completion of the search 13 December 1995	Examiner Klein, C
<p><b>CATEGORY OF CITED DOCUMENTS</b></p> <p>X : particularly relevant if taken alone Y : particularly relevant if combined with another document of the same category A : technological background O : non-written disclosure P : intermediate document</p> <p>T : theory or principle underlying the invention E : earlier patent document, but published on, or after the filing date D : document cited in the application L : document cited for other reasons ..... &amp; : member of the same patent family, corresponding document</p>			

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